WHAT IS THE BEST USE OF FISH RESOURCES IN THE U.S. GULF OF MEXICO?[1]

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ABSTRACT

Much information is needed to determine the best use of fish resources in the Gulf of Mexico. In the absence of an adequate knowledge of ecological relationships and of comparable economic values, socio-political forces will most likely play the most influential role in pursuading resource managers to favor recreational fishing as the best use.

RÉSUMÉ

Beaucoup d'informations sont nécéssaires pour déterminer le meilleur usage des ressources en poisson dans le Golfe du Mexique. En l'absence d'une connaissance adéquate des relations écologiques et de valeurs économiques comparables, des forces socio-politiques joueront très probablement le rôle le plus influent pour persuader les gestionnaires des ressources de favoriser la pêche de loisir en temps que meilleur usage.

INTRODUCTION

Besides their value in an environmental context, marine fishery resources have multiple commercial and recreational uses. Although commercial fishing has traditionally been the principal focus for fishery management, economists and recreational interests in recent years have largely helped to create a change in management philosophy, from the commercially oriented concept of maximum sustainable yield to the more general, and difficult to define, concept of optimum yield (Larkin 1977; Roedel 1975). Consideration of marine recreational fishing in fishery management is now mandated by law (The Fishery Conservation and Management Act of 1976, referred to as PL 94-265), which requires that optimum yield be determined by computing maximum sustainable yield and modifying it "by any relevant economic, social, or ecological factor."

Non-exploitation has been advocated by some when fish stocks (1) serve as major food sources for more desirable species, (2) should remain undisturbed so they may be viewed esthetically, and (3) are in danger of extinction.

Recreational and commercial fishing occur in most fisheries. Because of historical usages of a resource by both groups and because of the necessity of management measures either after a conflict arises between the user groups or after catches decline, the question of the best use of the resource is not usually asked. Rather, questions of allocations and of fishing restrictions are asked with an underlying assumption that management is acting to conserve the resource.

Criteria for best use are difficult to establish owing to the difficulty of obtaining objective or quantitative comparability between the uses. Since the motivations and purposes of recreational and commercial fishing differ, landings, effort, value of catches, expenditures, etc., with which use is measured, cannot be justifiably compared. Managers, therefore, accept uses by both groups and decide how much, where, when, and in what manner each group will share the resource. Alternative food sources, food requirements, and trophic relationships in the ecosystem must be known, all of which require detailed, lengthy investigations.

The economic, socio-political, and ecological

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aspects of fisheries and how these factors have, and will, affect decisions on uses of resources in the U.S. Gulf of Mexico are discussed below.

ECONOMICS

Determining the value of a commercial fishery is somewhat easier than for a recreational fishery. Records are available for the value of commercial landings and processed products, whereas usually few records are available for a recreational fishery. The problem of determining the value of recreational fisheries has been discussed often in great detail with little agreement on a solution (Stroud and Clepper 1976; Bell 1978). Because marine fish resources are common property, much of the difficulty centers around the nature of the resource and the purpose of the activity. That is, they are not owned by any one person or corporation, and thus usage of the resource is not marketed.

The significance of marine recreational fishing in Florida has been shown by Bell (1979). He studied the primary and secondary impacts, that is, the jobs and incomes that have been generated, by both recreational and commercial fisheries in Florida. (He stressed the preliminary nature of his study, and also that recreational values are conservative while commercial values are not.) Bell estimated that in Florida in 1975 more than $851 million were spent by marine recreational fishermen, marine recreational fishing supported about 118 000 jobs, and user value of marine recreational fishing and associated activities was about $1,16 billion. In marine commercial fisheries in Florida in 1975, Bell estimated that about $160 million in final sales was produced (validity of comparing user value and final sales is not implied); the direct and indirect employment amounted to about 36 300 jobs.

In certain coastal counties where marine recreational fishing is generally a significant portion of marine recreation, a significant impact by recreational fishing is indicated. For example, in 1978 in Bay County, Florida, about 11% of the total employment in the county was related to marine recreation (Fernald et al. 1979).

Although the growth of tourism and population in Florida (see below) is occurring faster than in the other coastal states of the Gulf of Mexico, the general trend is the same in all of the coastal states. The economic impact of this trend will require greater consideration of recreational uses of fish stocks by marine resource managers in the future. This does not have to occur with a concomitant decrease in commercial fishing, however. Consumers of seafood would not have to be denied, as allowances could be made for the entry of recreational catches into commercial markets, a practice already existing along the coasts of the Gulf of Mexico (and which has been advocated by Beaumariage 1978).

SOCIO-POLITICS

In Florida, socio-political pressure has already produced legislation declaring the commercial sale of certain species (sailfish *Istiophorus platypterus*, snook *Centropomus undecimalis*, bonefish *Albula vulpes*, tarpon *Megalops atlantica*) to be unlawful. Thus, these species have indirectly been declared recreational. Texas is the only other gulf state that has legislated against the commercial sale of a marine species (the anadromous striped bass *Morone saxatilis*, which has been introduced into freshwaters in that state and is only occasionally reported from salt water).

A large number of marine species in the U.S. Gulf of Mexico are fished by U.S. recreational fishermen but not by U.S. commercial fishermen. In addition to those species listed previously, the following are included: blue marlin *Makaira nigricans*, white marlin *Tetrapturus albidus*, spearfish *Tetrapturus pfluegeri*, blackfin tuna *Thunnus atlanticus*, yellowfin tuna *Thunnus albacares*, bluefin tuna *Thunnus thynnus*, and many species of sharks. Many of these species have been caught in the U.S. Gulf of Mexico by foreign commercial fishermen. The Gulf of Mexico Fishery Management Council (one of eight management bodies created by PL 94-265) and other councils have felt a great deal of pressure from marine recreational fishermen to take measures to prevent commercial fishing for these species.

The only marine fish harvested solely by commercial fishermen in the U.S. Gulf of Mexico is the gulf menhaden *Brevoortia patronus*, which is processed for fish meal and oil.

Political pressure from recreational fishing interests have had a considerable impact upon recreational and commercial fisheries for sciaenid fishes in the states bordering the Gulf of Mexico. In Louisiana commercial fishermen had been using monofilament gill nets with 4,7 cm ($1\frac{1}{2}$ in) mesh to catch spotted seatrout *Cynoscion nebulosus*. Recreational fishermen were able to get the law changed so that only gill nets

made of materials other than monofilament and of a mesh size of 5,1 cm (2 in) or larger could be used. In Texas, recreational fishermen exerted pressure to have the regulations changed so that neither recreational nor commercial fishermen can use their trotlines on weekends. Trotlines are used for catching red drum *Sciaenops ocellatus*. Declines in catches of large red drum, increases in catches of small red drum, and the danger of entanglement between trotlines and boats, especially on weekends when boating is heaviest, aroused recreational fishermen to have the regulations changed, thus reducing significantly fishing effort and danger of entanglement. In Mississippi, recreational fishermen were influential in getting limitations on both fishing gear and catches of red drum by commercial fishermen; other coastal states have also experienced the influence of recreational interests in regulating their sciaenid fisheries.

Other fisheries presently receiving socio-political pressures to control or ban particular types of fishing gear are the king mackerel *Scomberomorus cavalla* fishery and the reef fish (primarily snappers and groupers) fishery, both in south Florida. In the former, recreational fishermen and hook-and-line commercial fishermen have been especially vocal in attempting to have the use of gill nets banned. They claim that the gill nets capture excessive amounts of fish, that gill-net caught fish are of poor quality, and that a significant portion of the fish that are gill-netted fall to the bottom and are wasted as the gill net is hauled aboard the boat. In the reef fish fishery, the recreational interests are attempting to have fish traps banned. They claim that the traps overfish, that they contain significant numbers of non-food fish, and that coral reefs are damaged by setting and retrieving the traps. Whether or not their arguments have merit, these factions are placing an impressive amount of political pressure upon fishery managers.

Moreover, demographic changes in the coastal areas will tend to favor recreational fishing in management decisions to a greater degree in the future. The population has been increasing largely by immigration of northerners, who find the southern climate more desirable. As an example, Bay County, in northwest Florida, had an increase in population from 42 689 in 1950 to 67 131 in 1960 to 75 283 in 1970. In 1980, the population is projected to be 103 500 and in 2000 it is projected to be 148 385. Also in Bay County, from 1960 to 1970, the net immigration of persons under 50 years of age was negative, whereas net immigration of persons over 50 years of age was positive. The percentage of persons 55 years of age and older increased from 10,5% in 1960 to 14,4% in 1970 to 19,3% in 1977 (Florida Department of Commerce 1979).

With the influx of citizens (retirees) with more spare time, many will probably fish recreationally. That a substantial portion of anglers in certain types of fishing are older citizens has already been shown. Anglers 60 years and older comprised 44% of the pier fishermen in St. Petersburg, Florida (Fable and Saloman 1974).

Tourism also increases recreational fishing. All gulf coastal states, many coastal counties in the states, and individual municipalities are promoting tourism to their respective areas. Included in the promotions are invitations to participate in recreational fishing. Also, the number of fishing tournaments held in the coastal areas has been increasing. For example, the number of billfish tournaments in the Gulf of Mexico increased from 6 in 1972 to 21 in 1979.

Thus, increasing populations in coastal areas, increasing numbers of retirees, and increasing tourism will exert greater pressure upon fishery resource managers to consider recreational fishing more favorably.

ECOLOGY

The ecological factors that would be most useful in deciding best use of resources are those concerning predator-prey relations. Little is known of the trophic interrelationships between species in a marine ecosystem and how fluctuations in the abundance of one species affects the abundance of another. Managers of marine fish stocks therefore have not been able to utilize predator-prey information in their decisions, which is in contrast to managers of freshwater fisheries (Stroud and Clepper 1979).

For example, a controversy exists over the discarding of by-catches in the shrimp fishery in the Gulf of Mexico. When shrimp fishermen empty their trawl catches on the deck of their boat, the shrimp are selected and the remaining by-catch is dumped overboard. Many critics believe that the discards (mostly juvenile fishes and crustaceans other than shrimp) should be used in some manner rather than "wasted." Fishermen do not bring in the by-catch because it is not economically feasible. Others believe that the shrimp trawls should be redesigned to help prevent juvenile fish mortalities. Many of

these by-catch fish consist of species whose adults are eagerly sought by both recreational and commercial fishermen. Some consumers of the discards are species of fish sought by recreational fishermen—king mackerel, Spanish mackerel *Scomberomorus maculatus*, cobia *Rachycentron canadum*, bluefish *Pomatomus saltatrix*—all of which are frequently caught near shrimp boats. Is decreasing or eliminating the by-catch and thereby allowing those marketable species to grow and enter commercial markets advantageous over providing "free meals" to predator species that are increasing their biomass at minimum energy costs (no pursuit required) and which are being fished by recreational fishermen? The comparative bio-economics of biomass conversion of the two situations could be helpful in management decisions.

Future controversies concerning the commercial harvesting of prey species, such as various species of clupeids and various species of small carangids, can be anticipated. In Louisiana particularly, recreational fishermen have already expressed concern about the commercial fishery for menhaden, claiming that excessive commercial exploitation is removing the forage for predator species sought by them. Information on trophic relationships, that is, "who eats whom" in what locations during which seasons, is now becoming available from research projects. Such information may prove to be important in assessing the impact of a decline in abundance of prey upon the feeding habits and behavior of the predators and would be extremely valuable to resource managers (Stroud and Clepper 1979).

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